AMENDMENTS TO THE SPECIFICATION

On page 1, please replace the subheading "BACKGROUND OF THE INVENTION" with "BACKGROUND".

On page 2, please replace the subheading "SUMMARY OF THE INVENTION" with "SUMMARY".

On page 4, please replace the subheading "DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS" with "DETAILED DESCRIPTION OF THE VARIOUS EMBODIMENTS".

Applicant notes the original application was filed without paragraph numbers. To facilitate the incorporation of these amendments, Applicant has numbered the paragraphs. Please replace the following paragraphs rewritten in amendment format:

[0001] The present ~~invention~~disclosure is directed generally to a training system a method for a moving asset and in particular, to a real asset-to-simulated environment bridge and method.

[0010] Fig. 1 is a block diagram showing an application of the present ~~invention~~disclosure.

[0015] While the present ~~invention~~disclosure will be described in connection with a flight training system having flight assets, it can be appreciated that the present ~~invention~~disclosure applies to any training application involving a moving asset. As shown in Fig. 1, a typical training system in accordance with the present ~~invention~~disclosure includes one or more real flight assets 10 which communicate with a simulated environment 12 through a transceiver 14 and a flight asset-to-simulator bridge 16. The simulated environment 12 may include one or more simulators (not shown). In

the case of multiple simulators, they may be distributed across the same network or different networks. One or more communication links 18 connect the transceiver 14 to the bridge 16 and one or more communication links 20 connect the bridge 16 to the simulated environment 12. Communication links 18 are preferably a platform supported digital communication channel, but may be any medium which allows information from the real assets 10 to be communicated to the bridge 16 and vice-versa. Communication links 20 are preferably a platform supported digital communication channel, but again may be any medium which allows information from the bridge 16 to be communicated to the simulated environment 12 and vice-versa.

[0018] The flow of trajectory information being transmitted by the real asset, however, is often low-fidelity data (i.e. the data is constrained by the available bandwidth), while the information in the simulated environment is high-fidelity data. The bridge 16 employs a piecewise polynomial interpolation algorithm, as shown in Fig. 2, to alleviate this problem. Essentially, this algorithm helps fill in the gaps in the real asset data being received from the real asset. Specifically, at 100 the bridge 16 receives a set of real asset data periodically (in one embodiment, one set of data about every second). At 102, the bridge 16 then computes an equation for a curve to fit the real asset data received. The type and order of the curve may vary depending on the real asset data received. While the bridge 16 is waiting for new real asset data to arrive, at 104 it interpolates the position of the real asset, using the previously computed curve equations. At 106, the bridge checks whether any new real asset data has been received. If so, this process is repeated as necessary so as to create a series of curves. If the bridge 16 stops receiving real asset data, at 108 it uses dead reckoning

algorithms to the extent necessary to account for any dropouts of the real asset. At 110, the bridge further interpolates the real asset data to smoothly correct the flight path to new flight location. In order to make sure that the resulting curve is smooth (i.e., does not consist of a bunch of disjointed segments), the bridge 16 may use the velocities (i.e., the slope or first derivative) at the end points of each curve to ensure that the transition is smooth from one curve segment (or piece) to the next. With such a configuration, the bridge 16 can present accurate fluid motion of the real asset at high data rates in the simulated environment even though the information being received by the real asset is at a low data rate. The bridge 16 may also be configured to provide additional filtering to smooth out any spikes in the real asset data received, as well as algorithms to handle periodic dropouts in real asset data to ensure the fluid motion of the real asset is not disturbed. Figure 4 shows the simulation of a real asset using the bridge of the present ~~invention~~disclosure, while Figure 5 shows the simulation of a real asset without the use of such a bridge.

[0020] Information is exchanged in the simulated environment 12 through one or more simulation communication protocols. The bridge 16 constructs the messages needed to depict the real asset in the simulated world in accordance with the applicable protocol. In a preferred embodiment, the bridge 16 provides support for a plurality of simulation communication protocols including, without limitation, the DIS protocol, the HLA protocol and the TENA protocol. As a result, the present ~~invention~~disclosure allows for the operation of a simulated training exercise across a plurality of simulators using dissimilar protocols concurrently.

[0022] While the present ~~invention~~disclosure has been described by reference to specific embodiments and specific uses, it should be understood that other configurations and arrangements could be constructed, and different uses could be made, without departing from the scope of the ~~invention~~disclosure as set forth in the following claims. In particular, the ~~invention~~disclosure can be used in connection with any real asset and simulated environment.